INCITE Overview

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What is INCITE

INCITE: Innovative and
Novel Computational Impact
on Theory and Experiment

The INCITE program provides awards to academic, government, and industry organizations needing large allocations of computer time, supporting resources, and data storage to pursue transformational advances in science and industrial competitiveness.

Allocation programs
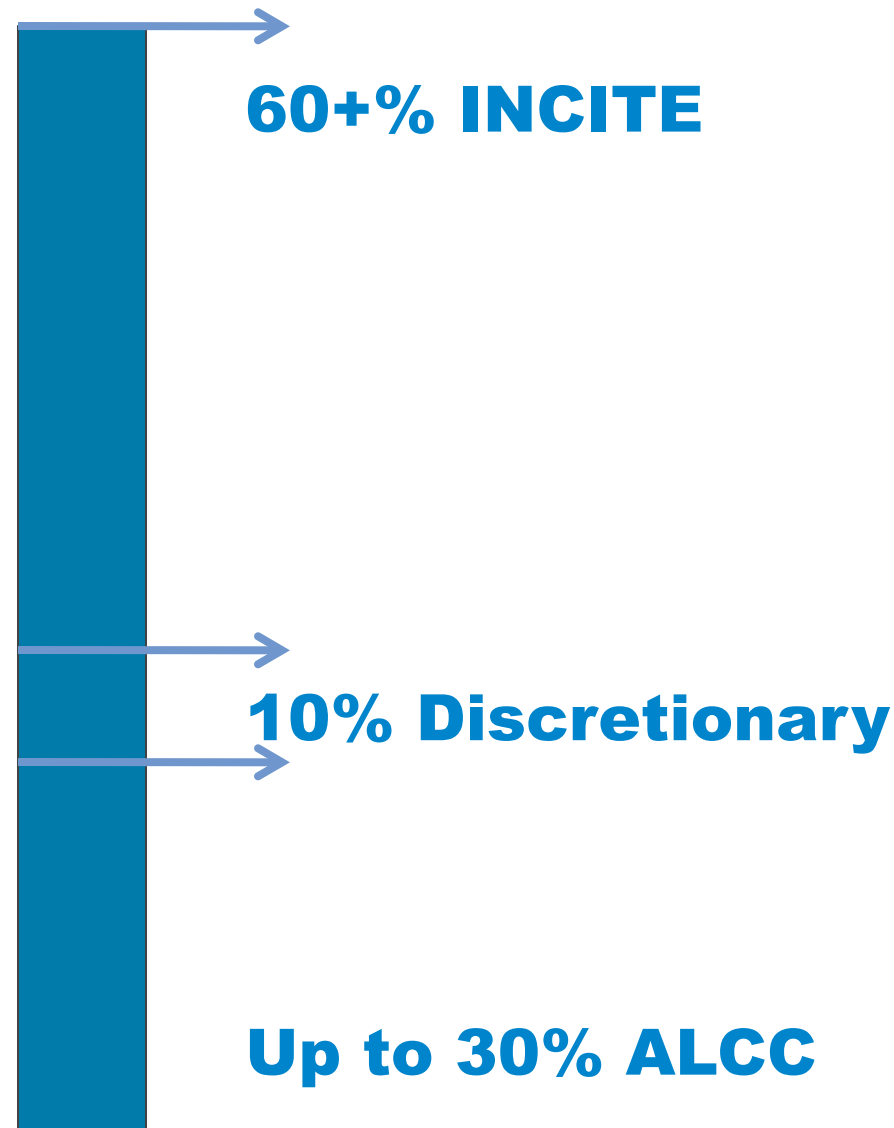
60+% INCITE

- Annual call for proposals
- Award 10's of millions of hours
- For projects of high impact in science, engineering, CS, that require leadership systems

10% Discretionary

- Considered year-round
- Award up to millions of hours

Up to 30% ALCC

- Allocated by the ASCR office

INCITE in its 7th year
Explosive growth in program allocations

more than 1.6 billion processors hours in 2010
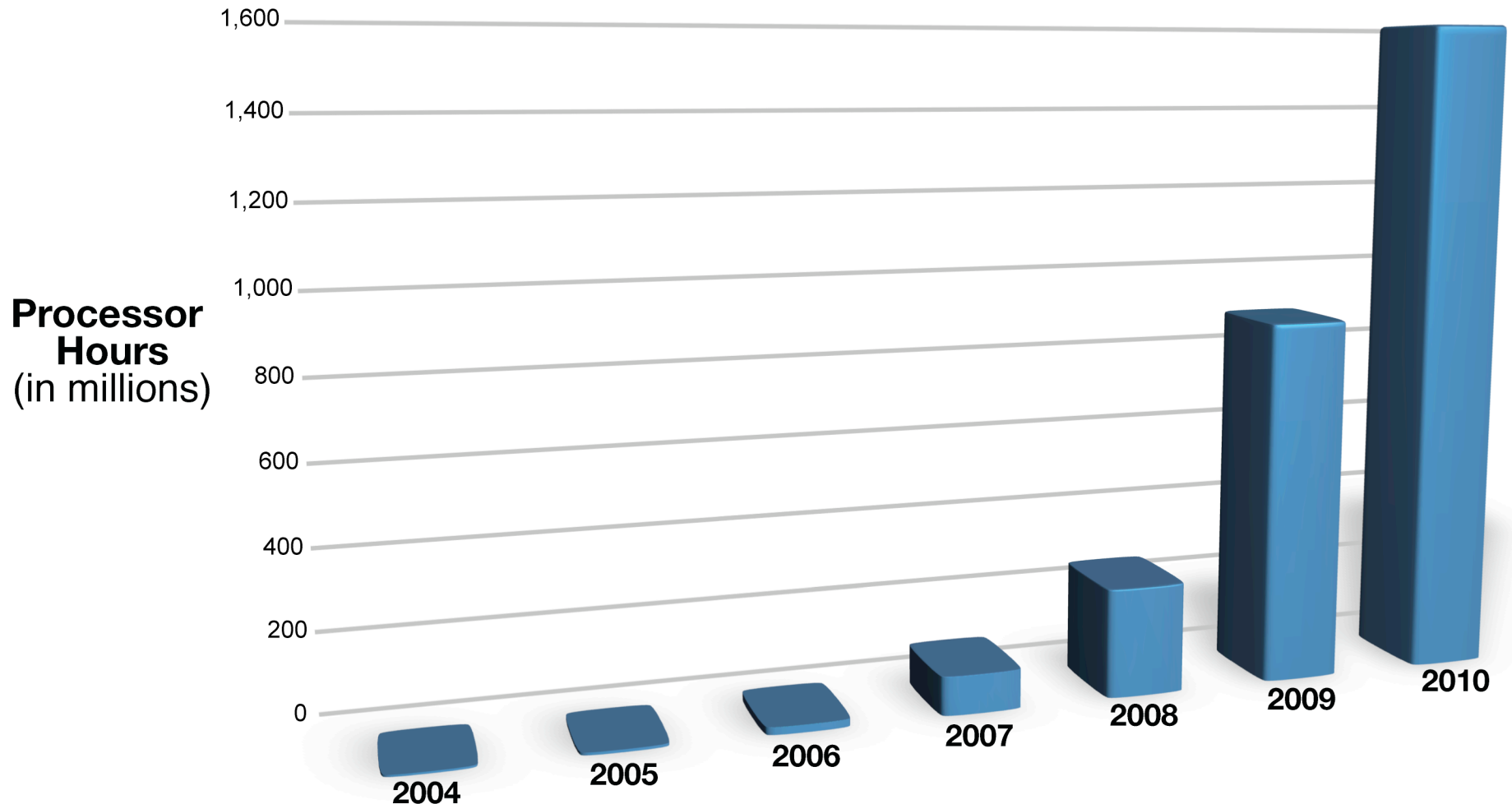
INCITE awards have grown

for large-scale, computationally intensive, high-impact research proposals

	2004	2005	2006	2007	2008	2009	2010
Projects	3	3	15	45	55	66	69
Processor hours	4.9M	6.5M	18.2M	95M	265M	889M	1,600M
Avg. per project	1.6M	2.2M	1.2M	2.1M	4.8M	13.5M	23.2M

FAQs

Q. What constitutes a "computationally intensive" research project?
A. A computationally intensive research project will use a majority of the processors (ex. >20%) and multiple cores, if applicable, in the proposed research.

Q. Are foreign researchers and teams eligible to apply?
A. Yes, foreign researchers may apply. Their proposals will be evaluated on the same scientific and technical criteria as those of domestic researchers.

Q. Must I have research funding from the Department of Energy?
A. No, DOE sponsorship is not required.

NOTE

Single- and **multi-year** proposals are accepted

Proposals may request access to a **single** resource or **multiple** resources

INCITE
U.S. DEPARTMENT OF ENERGY
LEADERSHIP COMPUTING

Who can apply for INCITE?

The INCITE program is open to researchers from academic, government, industry, and international institutions.

INCITE awards help advance the state-of-the-art in areas such as

- Accelerator physics
- Astrophysics
- Chemical sciences
- Climate research
- Computer science
- Engineering
- Physics
- Environmental science
- Fusion energy
- Life sciences
- Materials science
- Nuclear physics, and more

There is <u>no</u> designated number of hours for a particular science area; INCITE looks at all recommendations, focusing on potential for science or technological impact, then readiness.

2010 INCITE awards

In **2010** 1.6 billion processor-hours were awarded to 35 new projects and 34 renewal projects
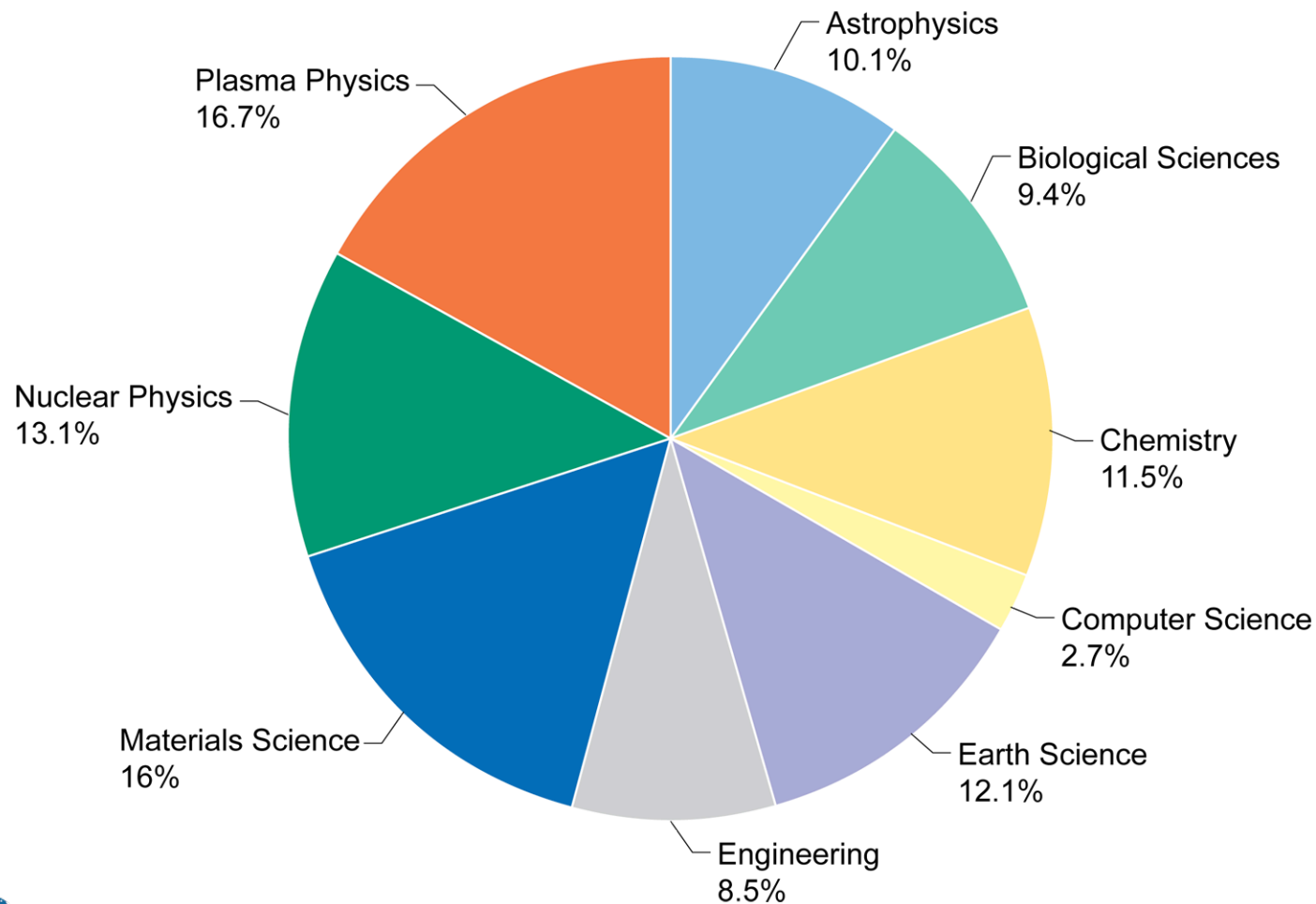
INCITE 2010 Statistics

Total Time Requested
- 3.7 billion processor hours for 2010

Total Time Awarded
1.6 billion processor hours

Average Hours Requested
- 27 million processor hours

Average Hours Awarded
23 million processor hours

Total Submittals
- 86 new and 41 renewals

Percentage Awarded
41% new and 83% renewals

What can you expect next?

- Get started: Working with center staff to activate accounts, port code, and begin simulations

- Show status: Periodically providing highlights

- Prepare for renewal: Submitting a renewal request (multi-year projects)

- Close out: Providing an end-of-year summary of work

INCITE timeline

Call for Proposals (new **and** renewals) April 14 to July 1

Computational Readiness Review

Scientific Peer Review

Announcements in November

Allocations from January 1 to December 31

Review process: Computational Readiness

Reviewers are center staff who are expert in these systems; both centers review each proposal

New Proposals

- Appropriateness for the requested resources

- Appropriateness of the computational approach

- Technical readiness

Renewals

- Met technical/computational milestones

- On track to meet future milestones

Review process: Panel Review

Independent review panels are comprised of domain experts drawn from institutions worldwide

New Proposals

- Scientific and/or technical merit

- Appropriateness of the proposal method

- Team qualifications

- Reasonableness of requested resources for the proposal

Renewals

- Change in scope

- Met technical/scientific milestones

- On track to meet future milestones

- Impact relative to other proposals under consideration
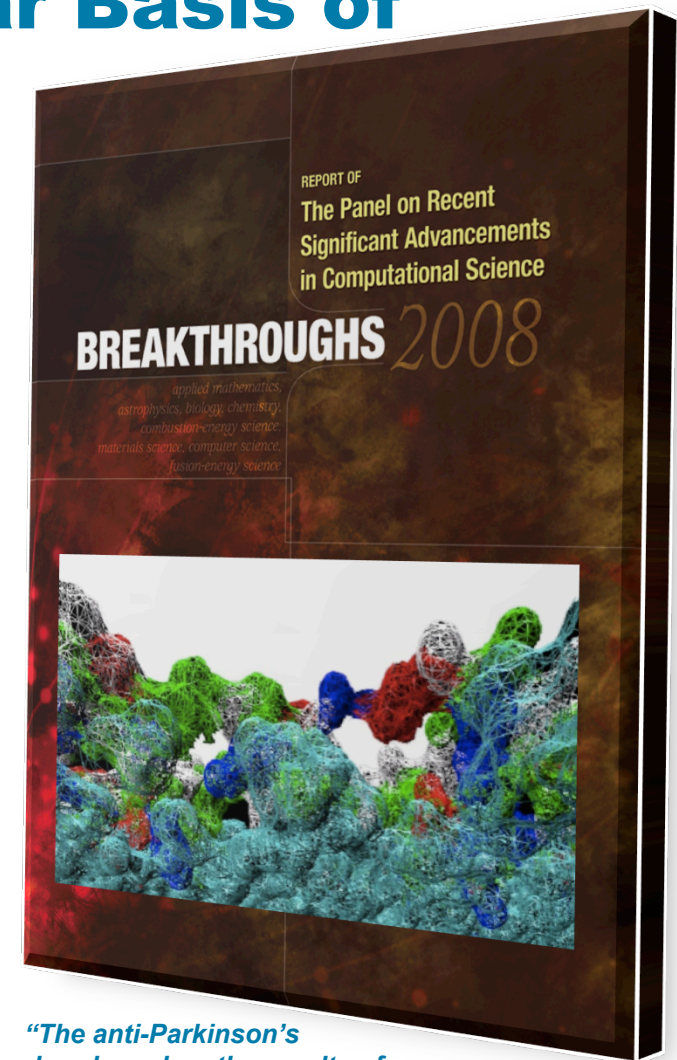
Stay in contact with the center

- Let them know if you're having difficulties

- Respond to requests for information

- **Communicate your successes to the center**

  The mission of INCITE is to enable high-impact, transformational scientific and technical results

Understanding the Molecular Basis of Parkinson's Disease

Understanding molecular mechanisms paves way to focus search for a treatment

- By using computer simulations to study how abnormal structures on proteins in the brain can cause clumping, researchers at the University of California are gaining a better understanding of Parkinson's Disease and ways to treat it.

- Using molecular models and simulations together with biochemical and ultrastructural analysis, scientists showed that the clumping of a protein known as a alpha-synuclein in the brain can lead to harmful pore-like structures. In contrast, another protein, beta-synuclein, appeared to block the clumping action.

REPORT OF
The Panel on Recent Significant Advancements in Computational Science

BREAKTHROUGHS 2008

applied mathematics, astrophysics, biology, chemistry, combustion-energy science, materials science, computer science, fusion-energy science

"The anti-Parkinson's drug based on the results of our modeling and simulations is in the early stages of development … These studies are impossible without a high-performance computer which is the Blue Gene at Argonne National Laboratory."

Igor Tsigelny, Univ. of California – San Diego, SDSC

Determining the Nature of heretofore Undetectable Particles

A Billion-particle simulation of the dark matter halo of the Milky Way

- Largest supercomputer simulation ever of dark matter evolving in a galaxy such as the Milky Way.

- By dividing the galaxy's envelope of dark matter into more than a billion parcels and simulating their evolution over 13 billion years, the team's Via Lactea II simulation showed that small dark matter structures from early in the galaxy's history survived, even as they were incorporated over billions of years into progressively larger structures.

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applied mathematics,
astrophysics, biology, chemistry,
combustion-energy science,
materials science, computer science,
fusion-energy science

nature

LOOKING GOOD

An electronic camera shapes up to the human eye

OLYMPIC DRUG TESTS
Not fit for purpose?

DISEASE MODELS
Taming the mouse

EPIGENOMICS
On the track of drug targets

Contacts

For details about the INCITE program:

http://hpc.science.doe.gov

INCITE@DOEleadershipcomputing.org

For details about the Discretionary programs:

https://wiki.alcf.anl.gov/index.php/Discretionary_Allocations

support@alcf.anl.gov

http://www.nccs.gov/user-support/access/project-request/

help@nccs.gov